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ABSTRACT

Although current policy debate on school restructuring is centered on choice, empowerment, and professionalization issues, the effects of communally organized schools has received little attention. This paper postulates that student achievement, particularly in mathematics, is related to selected elements of communal schools (shared norms and values, teacher collaboration, and focus on student learning). The paper also assumes that the sense of community as indicated by these elements differs between middle schools and senior high schools. Supposedly, middle schools have a greater tendency than high schools to be organized communally rather than bureaucratically. Exploratory data analysis of survey data from a national sample of middle-school students and their mathematics teachers (the Longitudinal Study of American Youth) yields mixed results. Middle schools and high schools have similar organizational structures. Further, student achievement growth in middle schools is related to two critical elements of community: shared norms, values, and beliefs, as indicated by teacher commitment; and focus on student learning, as indicated by teacher expectations. Similarly, student achievement in high school appears to be related to teacher commitment, collaboration, and focus on students. An appendix describing variables, and four statistical tables are attached. Contains 49 references. (MLH)

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THE EFFECTS OF SELECTED ELEMENTS OF COMMUNAL SCHOOLS ON MIDDLE AND HIGH SCHOOL MATHEMATICS ACHIEVEMENT

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ABSTRACT

Current policy debate on school restructuring is centered on issues of choice, empowerment, and professionalization among others. Yet little attention has been focused on the effects of schools organized as communities. We postulate that student achievement--specifically mathematics achievement--is related to selected elements of communal schools. The elements of community which we examine are shared norms and values, teacher collaboration, and focus on student learning. We assume, moreover, that the sense of community as indicated by these elements differs between middle school and senior high school. Indeed, we assume that, in general, middle schools have a greater tendency than high schools to be organized communally rather than bureaucratically. Exploratory data analysis of survey data from a national sample of middle students and their mathematics teachers yield some mixed results. No differences exist between middle schools and high schools concerning the strength of presence of communal variables. Further, student achievement growth in middle schools is related to two critical elements of community: shared norms, values, and beliefs as indicated by teacher commitment; and focus on student learning as indicated by teacher expectations. Similarly, student achievement in high school appears to be related to teacher commitment, collaboration, and focus on students.

THE EFFECTS OF SELECTED ELEMENTS OF COMMUNAL SCHOOLS ON MIDDLE AND HIGH SCHOOL MATHEMATICS ACHIEVEMENT

While a large body of research has focused on particular aspects of teachers' work lives, such as the importance of intrinsic rewards for teachers (see, for example, Biklen, 1983; Lortie, 1975; Reyes, 1990, among others), the connection between teachers' sense of efficacy in their work and their occupational identity and sense of satisfaction (Lee, Bryk, & Smith, 1993; Conley & Levinson, 1993), an emerging line of research focuses on the relationship between the organization of schools and teachers' worklives (Lee, Bryk, & Smith, 1993). Scholars, moreover, have embarked upon establishing a connection between a school's organizational effect on school personnel and differential student outcomes (Newmann, Rutter, & Smith, 1989). From these recent inquiries, two organizational forms for schools have emerged: schools as bureaucratic institutions and schools as small communities (Lee, Bryk, & Smith, 1993).

Based upon some of the recent works on the organization of schools, we assume that some schools are organized communally rather than bureaucratically. Using this assumption as a starting point, we set out in this paper to investigate the effect of organizing schools as communities on the achievement of students. Specifically, we argue that organizing a school communally should result in increased student mathematics achievement. Further, we hypothesize that the recent reform efforts aimed toward the reorganization of middle schools as communities exemplified in documents such as *Turning Points: Preparing American Youth for the 21st Century* (Carnegie Council, 1989) should result in a greater tendency for middle schools than high schools to exhibit the characteristics of a community. In both cases, we test our hypotheses utilizing three selected elements of a community: (1) commitment to shared norms, values, and beliefs; (2) teacher collaboration; and (3) focus on student learning. All three of these elements are critical components of communal schools (Bryk & Driscoll, 1988; Kruse, Seashore Louis, & Bryk, 1994; Lee, Bryk, & Smith, 1993; Sergiovanni, 1994). In addition, two theoretical notions inform our study: formal organizations and communal organizations. Both notions are gleaned from the current literature on schools as organizations.

Communal Schools and Student Achievement

The way in which schools are organized, according to Lee, Bryk, and Smith (1993), does affect student achievement. Indeed, Newmann (1991) asserts that the traditional rational-bureaucratic model for the organizations of schools tends to have a deleterious effect on student achivement. In concurring with Newmann and a host of other researchers (see, for example, Bryk & Driscoll, 1988; Lee, Bryk, & Smith, 1993; Lee & Smith, 1994; among others), we contend that organizing schools bureaucratically tends to have a negative impact on student achievement while organizing schools communally has a positive impact on student engagement and achievement.

"The central premise of communally organized school is shared and common, rather than differentiated, purposes and activities" (Newmann, 1990, p. 242). Indeed, in communally organized schools, "school members (both teachers and students) pursue common activities and get to know each other well" (Lee & Smith, 1994, p. 2). These common activities, in fact, help to foster strong, trusting relationships among school members and to link students to faculty, administrators, and school traditions (Bryk & Driscoll, 1988; Lee & Smith, 1994). Further, a system of core values that are shared and commonly understood among all members provides a framework for these common activities and relationships in communal schools (Bryk & Driscoll, 1988; Lee & Smith, 1994; Sergiovanni, 1994).

The existence of any set of core values and beliefs that is widely accepted by faculty members, however, does not indicate the existence of community (Lee, Bryk, & Smith, 1993). Rather, Bryk and Driscoll (1988, p.5) contend that these core values should be "beliefs about the purpose of the institution, about what students should learn, about how teachers and students behave, and about the kind of people students are and what kind they have the capacity to become." With respect to these last two points, Lee, Bryk, and Smith (1993) argue that the core values of a communal school must include an emphasis on caring, respecting, and nurturing all members of the school. In short, to be considered communal in nature, schools must embody an

"ethic of caring" for all members of the school (Bryk & Driscoll, 1988). Communally organized schools, then, possess a common system of norms, values, and beliefs, a common agenda of activities, and a strong commitment to student learning and both the personal and social development of students (Bryk & Driscoll, 1988; Lee, Bryk, & Smith, 1993; Sergiovanni, 1994).

Communal schools impact student achievement in a number of interrelated ways. First, teachers' worklives are significantly improved in schools organized as communities (Bryk & Driscoll, 1988). Specifically, communal schools tend to increase teachers' sense of efficacy, improve their morale, enhance the enjoyment and satisfaction they derive from their work, and increase their level of commitment (Bryk & Driscoll, 1988; Lee, Bryk, & Smith, 1993). Each of these outcomes of communally organized schools has been linked to increased student achievement. Second, collaboration among teachers is increased in communal schools (Bryk & Driscoll, 1988). Teachers who collaborate, as Newmann (1994, p. 1) argues, "are more likely to be effective with students, because they will benefit from expanded resources." Third, the strong social ties between adults and students and among students developed in communal schools reduces the alienation traditionally experienced by students in secondary schools and increases students' engagement with school (Newmann, 1994). The decrease in alienation and increase in engagement can significantly enhance students' engagement with learning (Newmann, 1981).

Fourth, communal schools characteristically send clear and consistent messages about the objectives of schooling and the school's expectations of students. In fact, a growing body of literature supports the contention that effective schools transmit their objectives and expectations in such a manner. Thus, when school personnel clearly communicate the objectives of schooling and their expectations of students, as they do in communal schools, student achievement tends to increase. Finally, teachers in communal schools take active responsibility for their students' academic success (Bryk & Driscoll, 1988; Lee, Bryk, & Smith, 1993). When this occurs, students are likely to be actively engaged in the learning process resulting in increased academic achievement (Newmann, 1992, 1994; Winfield & Manning, 1994). Thus, the personal care, attention, encouragement, and motivation students receive from teachers in communal schools

seems to yield a positive impact on student achievement. To reiterate, then, the core elements of a community--namely a common system of norms, values, and beliefs, a common agenda of activities, and a strong commitment to student learning and the personal and social development of students--positively affects student academic achievement.

Middle Schools as Communal Schools

Our second hypothesis is that, in general, middle schools tend to be organized more or less as communities whereas high schools generally tend not to be organized as communities. Rather, we assume that high schools are typically organized more or less as bureaucratic organizations. We, therefore, postulate that middle schools are more likely than high schools to possess a common system of norms, values, and beliefs, a common agenda of activities, and care about both student academic and personal development. In short, we assume that middle schools are more likley to exhibit the characteristics of a communally organized school.

Our assumption is based primarily on the recent reform efforts at the middle school level which parallel many of the communal school characteristics. Some of these efforts, based on the principles delineated in *Turning Points: Preparing American Youth for the 21st Century* (Carnegie Council, 1989), include dividing large middle schools into smaller communities for learning (e.g., schools-within-schools), transmitting a core body of knowledge to all students, and creating organizational plans which ensure success for all students (Lesko, 1994). Encapsulated within these broad principles are a variety of more specific reform initiatives such as interdisciplinary teaming of teachers, detracking, and cooperative learning, among other organizational changes which can increase the likelihood of the development of a sense of community within a school. Essentially, the Carnegie document argues that, if middle schools are to be successful, they must become "a place where close, trusting relationships with adults and peers create a climate for personal growth and intellectual development" (p. 37). In short, then, they argue that middle schools must become more communal in nature if they are to successfully educate all of their students.

In contrast, we postulate that high schools are less likely to possess a common system of norms, values, and beliefs, a common agenda of activities, and to care for student development than middle schools. Indeed, a combination of a variety of factors endemic in high schools--especially large high schools--creates a situation in which the development of a sense of community is exceedingly difficult. First, departmentalization, subject specialization of teachers, and tracking of students often precludes the development of either a common system of norms, values, and beliefs or a common agenda in high schools (Lee & Smith, 1994; Lee, Bryk, & Smith, 1993; Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989). Teachers of different tracks, special programs, and subject areas, in fact, may have quite disparate goals for their students and classes (Lee, Bryk, & Smith, 1993; Winfield & Manning, 1994). Indeed, Lee, Bryk, and Smith (1993, p. 214) contend that "It seems plausible that there is a casual link between departmentalization and lack of community. Specifically, if departmentalization acts to foment subgroup closure, the research on communal organization suggests that negative social consequences may occur across the whole school for both teachers and students."

Second, high school teachers are less likely to collaborate with their peers due to, in large part, the barriers to collaboration inherent in the organizational structure of most high schools. These barriers to collaboration often result in a decrease in teacher commitment to the school as a social unit, the academic goals of the school, to students as individuals, and to their field (Seashore Louis, 1994). A lack of collaboration, moreover, tends to greatly increase the alienation of teachers (Seashore Louis, 1994). Both of these--lack of teacher commitment and increased sense of alienation--are negatively associated with a sense of community (Seashore Louis, 1994). Thus, with little time and opportunity for collaboration and the resultant lack of commitment and increase in alienation, it is highly unlikely a group of teachers will be able to generate a common system of norms, values, and beliefs or to be highly committed to caring for students as whole individuals. In other words, the opportunity to collaborate is critical to the development and maintenance of community.

Third, high school teachers tend to be more committed to the subject matter within their individual disciplines than they are to student development (Lee & Smith, 1994; Lee, Bryk, and Smith, 1993; Wehlage, Rutter, Smith, Lesko, and Fernandez, 1989). Further, high school teachers view their social ties primarily to their department rather than to the school (Lee, Bryk, and Smith, 1993; Wehlage, Rutter, Smith, Lesko, and Fernandez, 1989). If teachers are more committed to their subject matter than to student developme t, then an ethic of caring for students is unlikely to permeate the school. In addition, teachers committed more to their department than to the school are intuitively less likely to invest in a school-wide shared sense of norms which focus on the caring for and respecting of students and colleagues. In short, teachers committed more to their subject matter than to student development and to their department more than to the school are less likely to create and sustain a positive sense of community.

And finally, high school teachers tend to shift the expectations and encouragement for academic success away from themselves and onto their students. In other words, high school teachers tend not to become personally involved in providing the motivation, encouragement, and support so often necessary for the academic and social development of students. High schools teachers, thus, are less likely than middle school teachers to create and sustain the caring, nurturing environment so characteristic of communal schools. We postulate, therefore, that high schools are less likely than middle schools to possess a shared sense of norms, values, and beliefs, a common agenda, or an ethic of caring for both the academic and personal development of all students. High schools, therefore, are less likely to operate communally than middle schools.

Two theoretical notions inform our assumptions: schools as rational-bureaucratic organizations and schools as communal organizations. In the remainder of this paper, we will first provide a brief discussion of both types of school organizations. Subsequently, we will discuss some of the effects of some selected elemnts of communal schools. Finally, we will describe our methodolgy, report our findings, and discuss the implications of our results.

CONCEPTUAL MODELS OF SCHOOLS

Schools As Formal-Bureaucratic Organizations

For much of this century, the majority of schools within our vast educational system, especially high schools, have been more or less bureaucratic in nature (Katz, 1971). The conception of schools as bureaucracies and the widespread replication of the urban school's bureaucratic organizational structure even became so prevalent as to be called "the one best system" for all schools (Tyack, 1974). The trend towards the bureaucratization of schools, especially high schools, continued throughout the 60s and 70s following the release of Conant's *The American High School Today* (1959) which advocated the consolidation of smaller high schools into large, comprehensive high schools in order to enhance the academic offerings of such schools (Lee, Bryk, & Smith, 1993). The consolidation of schools, in fact, in conjunction with the universality of our school systems, necessitated an increase in the bureaucratization of high schools (Sedlak, Wheeler, Pullin, and Cusick, 1986). Even today, the majority of US schools, especially high schools, continue to be bureaucratic (Sergiovanni, et al., 1992).

Schools organized as bureaucratic organizations, possess a number of common characteristics. First, schools organized as bureaucracies exhibit a functional division of adult labor into specialized tasks (Bidwell, 1965; Owens, 1987; Sergiovanni, 1992; Hanson, 1991; Lee, Bryk, & Smith, 1993). This division of labor became necessary as an increasing number of diverse students entered into the system. Thus, as schools increased in both diversity and size, the specific roles of teachers became more and more specialized in an effort to serve efficiently the clientele of the school (Lee, Bryk, & Smith, 1993). Eventually, this trend towards specialization resulted in teaching roles being defined by subject matter and type of student. Hence, a teacher would no longer be described as just a high school teacher, but rather as an honors mathematics teacher, remedial English teacher, bilingual science teacher, or a special education teacher. Further, as teachers' roles became increasingly specialized, schools were divided into departments specializing in specific subject areas (Lee, Bryk, & Smith, 1993) often

with the result that teachers of a specific subject area were housed on one area of the school. Such an arrangement would generally serve to impede, rather than enhance, the development of school-wide collaboration, goal consensus, and, hence, community (Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989).

Second, the increasing size, diversity, and role specialization within the school required a large and specialized administrative staff to manage the resulting complexity (Lee, Bryk, & Smith, 1993). In other words, as schools increased in complexity and role specialization, an hierarchical system of governance and control was instituted in an effort to manage efficiently and effectively the complexity (Bidwell, 1965; Owens, 1987; Sergiovanni, 1992; Hanson, 1991; Lee, Bryk, & Smith, 1993). Comprehensive schools, thus, expanded their administration to include a principal, a host of assistant principals, building managers, and even department chairs (Sergiovanni, 1992). On top of this school level hierarchy was placed a vast, complex, district-level hierarchy. The entire system, then, became one characterized by multiple levels of hierarchical control and an increasing centralization of power in the hands of the few in the top levels of the hierarchy.

Third, concomitant with the development of a hierarchical ordering of personnel was the development of a "form of authority that is attached to the role within the organization rather than to the person occupying the role" (Lee, Bryk, & Smith, 1993, p. 173). Thus, because a person was higher on the hierarchical chain of command, they were considered more of an authority than someone lower in the hierarchy, regardless of the actual knowledge or ability of either person. For example, because a principal is higher in the hierarchy than a teacher, s/he would be considered more of an expert on pedagogical techniques than the teacher.

Fourth, as the school increased in size and specialization, a need for standardized rules and procedures also became necessary as a means to manage the concomitant complexity (Bidwell, 1965; Owens, 1987; Sergiovanni, 1992; Hanson, 1991; Lee, Bryk, & Smith, 1993). Schools, as a result, instituted curriculum guides, policy handbooks, written guidelines for

behavior, and standard operating procedures (Owens, 1987) in an attempt to ensure uniformity, predictability, and stability within the large, complex organization (Hanson, 1991).

Finally, schools instituted an emphasis on social interactions that are rule governed and affectively neutral (Bidwell, 1965; Owens, 1987; Sergiovanni, 1992; Hanson, 1991; Lee, Bryk, & Smith, 1993) in the belief that the organization can be run more efficiently "if purely personal, emotional, and irrational elements are eliminated" (Hanson, 1991, p. 21). Teachers, for example, must evaluate and grade student performance, thus they must maintain an impersonal, unemotional relationship with students in order to judge objectively the accomplishments of the students (Bidwell, 1965).

Schools As Communities

Not all schools, however, must be viewed as formal organizations. They may, rather, be viewed as communities. Indeed, in order "to counter the problems of bureaucracy, many educators and reformers are moving toward support for a 'communal' model of school structure" (Lee & Smith, 1994, p. 2). According to Bryk and Driscoll (1988), there are three core concepts of communal schools. First, communal schools possess a commonly shared and understood system of values. Second, communal schools have a common set of activities in which almost all members participate. This participation marks each individual as a member of the community and develops and strengthens the relationships among all community members. Finally, communal schools possess an ethic of caring. This ethic of caring is manifested in the high esteem teachers hold of one another and in the personal interest in students exhibited by the faculty and staff of the school.

In communities, then, people are no longer connected with their work and their co-workers by mere contractual agreements, but rather by commitments to the values, beliefs, and ideas of the community as a whole and to their fellow workers as important individual human beings apart from their organizational roles and achievements. Indeed, communities, as opposed to bureaucratic organizations, are socially organized around the relationships between and among

the members of the community and the interdependencies upon which the relationships are based (Blau & Scott, 1984). This focus on relationships can "help teachers and students be transformed from a collection of 'Is' to a collective 'we,' thus providing them with a unique and enduring sense of identity, belonging and place . . . [and lifting them] to higher levels of self-understanding, commitment and performance." (Sergiovanni, 1994, p. 4). Thus, extensive rules, regulations, supervision, evaluation, monitoring, and other control mechanisms are no longer necessary in a communal school. Schools as communities, hence, are characterized by a sense of belonging and connectedness. Indeed, teachers and students in communal schools feel a sense of membership and inclusion in the community. According to Newmann (1992), this sense of membership and inclusion is a basic requirement for the student engagement necessary for learning to occur. Furthermore, Newmann (1992, p. 1) asserts that to create this sense of membership within students, schools must:

> communicate clear, noncontradictory purposes as the goals of education; that they treat students fairly; that they offer reliable personal support to help students undertake the hard and risky work of school; that they communicate high expectations and demonstrate accountability for the success of all students; and that these responsibilities be discharged through a climate of care that shows respect for all, regardless of the level of individuals' performance.

In addition, one of the critical tasks in developing this culture of inclusion is "to nurture teachers' commitment and competence to teach all students" (Newmann, 1992, p. 2). Thus, as opposed to formal organizations, communities are highly engaging rather than alienating. Teachers in communal schools tend to be more satisfied with their work, more loyal and committed to the school community, and have a higher sense of morale than their colleagues teaching in bureaucratic schools (Bryk & Driscoll. 1988; Lee, Bryk, and Smith, 1993). Students, moreover, tend to exhibit higher levels of attendance, fewer student-teacher conflicts, higher graduation rates, and higher levels of achievement (Bryk, and Driscoll. 1988; Lee, Bryk, and Smith, 1993).

EVIDENCE OF EFFECTS OF COMMUNAL SCHOOLS

Shared Norms, Values, and Beliefs

Schools that are organized as communities possess a shared sense of norms, values, and beliefs (Bryk and Driscoll, 1988; Lee, Bryk, & Smith, 1993; Lee & Smith, 1994; Kruse, Seashore Louis, and Bryk, 1994; Newmann, 1994; Sergiovanni, 1994). These norms, values, and beliefs are not vague and general, but rather are clearly focused on the instruction of students, the subsequent student learning that takes place as a result of the instruction, how teachers and students should behave, about the kind of people students are, and the type of people students have the capacity to become (Bryk and Driscoll, 1988; Lee, Bryk, & Smith, 1993; Newmann, 1994). In general, these norms, values, and beliefs of a communal school, as a whole, can be characterized as an ethic of caring in which the feelings and welfare (including the academic and intellectual well-being) of all individuals within the school community are paramount (Bryk & Driscoll, 1988). This ethic of caring is manifested in the esteem teachers hold for each other and the personal interest teachers take in their students that reaches beyond the strict confines of the classroom.

In a communal school, these norms, values, and beliefs arise from the development of a consensual purpose of schooling which "reflects a common destiny for the school's students" and from the "social interactions that form a faculty culture" (Bryk and Driscoll, 1988, p. 6). Furthermore, the faculty and staff of the school communicate these norms, values, and beliefs to other faculty, students, and the public through both their words and actions on a daily basis (Bryk & Driscoll, 1988). As a result, most students come to adopt the norms, values, and beliefs of the school (Bryk & Driscoll, 1988).

In their review of the literature, Firestone and Pinnell (1992, p. 2) conclude that "a committed person will believe strongly in the [organization's] goals and values." With respect to teaching, committed teachers have a strong conviction and investment in the norms, values, and beliefs of the school--specifically about what students should learn (Reyes, 1991). Furthermore,

it is known that the greater the teacher's commitment to a school, the more likely she/he is to be involved in school social opportunities (Reyes, 1991) and, therefore, the greater the opportunity to transmit the norms, values, and beliefs of the school to the students. Indeed, Bryk and Driscoll (1988, p. 10) state:

> in communally organized schools teachers spend time in non-classroom activities that enhance the social life of the school. Teachers come to know many students, including those they have not had in class. Students in turn perceive teachers as having an interest in their lives as well as their academic achievements.

In addition, committed teachers are far more likely to be directly involved with student-related concerns and to exhibit an ethic of caring than uncommitted teachers (Reyes, 1991). Although the notion of teacher commitment incorporates a number of other different components, we propose that the level of teacher commitment within a school is an adequate indicator of a shared sense of norms, values, and beliefs (For a more in-depth discussion of teacher commitment, see Reyes, 1991 and Rosenholtz, 1989, among others).

Teacher Collaboration

Collegial relations among school faculty is one of the specific organizational features which visibly reflects the distinctive social relations in a communal school (Bryk & Driscoll, 1988). Indeed, Newmann (1992) notes that a collegial/collaborative faculty culture is a characteristic of communal schools while Rutter and Jacobsen (1986) report an association between teacher collaboration and a sense of community.

Bryk and Driscoll (1988) purport that collegial interactions affect both the quality of relationships among the faculty and the effectiveness of instruction. Collaboration provides teachers the opportunity to develop valuable, meaningful relationships which tends to increase the likelihood that teachers perceive the school as having a friendly atmosphere and that teachers derive a sense of satisfaction from their work (Bryk & Driscoll, 1988). Consequently, the technical work of teachers--namely the teaching of children and adolescents--is enhanced (Bryk

& Driscoll, 1988). The effectiveness of instruction is also enhanced because "teachers who collaborate with their colleagues . . . benefit from expanded resources" (Newmann, 1994, p. 2) which include not only additional materials and activities that improve instruction, but also new curriculum and assessment for students (Kruse, Seashore Louis, & Bryk, 1994).

Focus on student learning

One of the critical elements of communal schools is a "collective focus on student learning" (Kruse, Seashore Louis, and Brýk, 1994, p. 4). Kruse, Seashore Louis, and Bryk (1994, p. 4), in fact, assert that teachers in communal schools "assume that all students can learn at reasonably high levels, and that teachers can help them, despite many of the obstacles that students may face outside of school." In other words, the focus on student learning within communal schools can be construed as possessing high expectations and a high degree of teacher encouragement.

High expectations A critical element of communal schools includes holding high expectations for all students (Bryk & Driscoll, 1988). In most schools--especially high schools--high expectations are not held for all students. Indeed, different levels of expectations held for students are often manifested in a system of "tracking" in which some students are expected to learn college preparatory material while others students are expected to learn only the "basics" or vocational skills (Oakes, 1985). This differentiation occurs not only on a school-level basis, but also within individual classrooms (Brophy & Good, 1981). In this way, then, students are separated into different groups, thereby preventing all students from sharing a common set of experiences. Since a common experience is one component in developing a community (Bryk & Driscoll, 1988), differential expectations within a school and/or classroom obstruct the development of a school community.

Furthermore, Newmann (1992), contends that teachers must hold and communicate high expectations for all students in order to develop a culture of membership and inclusion. That is, holding and communicating high expectations for all students is a critical component in building

a sense of community (Sergiovanni, 1994). Moreover, not only are high expectations a component of community, but according to Brophy and Good (1981), high expectations are inextricably linked to student achievement.

Teacher encouragement Teacher encouragement is a major component in motivating students to achieve. Indeed, Brophy and Good (1981, p. 316) state that, if students are to be successful, then "the teacher must repeatedly encourage the students and express the belief that they will be able to succeed with continued effort." This encouragement is needed since "academic learning is hard work . . . [and] if teachers simply leave it up to students to choose whether or not to learn , many students will be left behind" Newmann, 1994, p. 1). In fact, research indicates that when students are motivated, they concentrate and achieve at higher levels (Brophy & Good, 1981; Bryk & Driscoll, 1988).

Teachers can encourage students in a variety of ways in their attempt to foster students' motivation (Brophy and Good, 1981). Two major techniques of teacher encouragement are academic push and career push. Academic push simply means that teachers strongly encourage their students to work hard in school and at home on their mathematics, while career push means that the teacher strongly encourages the student to pursue a career in mathematics. We argue that both of these components are indicators of focus on student learning in the sense that both academic push and career push symbolically communicate to the students that student learning--in this case, the learning of mathematics--is of the utmost importance. Both academic and career push, moreover, are likely to be indicators of teacher engagement and strong social ties between teachers and students and that teachers take active responsibility for student learning.

METHOD

The Longitudinal Study of American Youth (LSAY) is a four year panel study of middle and high school science and math education which began in the fall of 1987. (See Miller, Suchner, Hoffer, and Brown, 1992.) A two-stage stratified probability sample was obtained to collect data for the LSAY project. The schools were selected with probabilities proportional to

geographic region and by degree of urban development. From these strata, schools were selected at random. This produced a total of 12 sampling strata (four regions by three types of communities). The second stage of the sampling strategy included the random selection of students within the schools selected in the first stage. Two hypotheses were tested: The first tested mean differences in the level of organizational community between middle and high schools. The unit of analysis is the school. That is, the student and teacher data were collapsed from the individual level to the school level. The second hypothesis analyzed the effects of communal variables on mathematics achievement gains for both middle and high school students. It should be noted that only the students tested in seventh grade and later tested in tenth grade were selected in the regression models.

MEASURES

Student Data

Student achievement is measured as a composite score of student performance on the cognitive domains measured by the NAEP/LSAY tests. The cognitive processes measured in the math test includes a) recall and recognition of mathematical words and symbols, b) use of math knowledge and skill to solve problems, and c) solving multistep problems (see Miller, Hoffer, Suchner, Brown, and Nelson, 1992). This item was scaled so that the mean is 50 with a standard deviation of 10. The reliability coefficient for the math test is .88 (see Miller et al., 1992 for further information on the psychometric properties of the math test). The base-year samples consisted of 3,166 7th graders and 2,829 10th graders drawn from 52 pairs of middle and high schools. A total of 60 students was selected from each school and from both the 7th and 10th grades. In the fall of each year, students receive an achievement test in both math and science based on items selected from the National Assessment of Education Progress (NAEP) and a questionnaire regarding background and attitudes. The LSAY project also collects data from the science and math teachers in the participating schools. The teacher questionnaire asks about the classes in which students are enrolled and about their professional backgrounds and

characteristics of schools. In addition, the LSAY project conducts interviews with parents to augment the students' family background.

The student background variables included: family socioeconomic status defined as a composite score from indices of parental education, occupation, and household possessions, student gender, and race-ethnicity (see Miller et al., 1992 for further description of variables. The parental education and occupation information was collected from parents' interviews in the springs of 1988 and 1989. A dummy variable for sex (1 = female) was constructed from student questionnaire responses. Information from parents on their educational and occupational levels, and data from students on household possessions, yielded a composite indicator of student socioeconomic status (SES), scaled in standard deviation units. The household possessions, gender, and race/ethnicity variables were subtracted from students' self reports during the collection of the base-year data.

Teacher Data

We hypothesize that several teacher variables are indicators of the level of community within a school while also being closely related to student achievement. In this study, the following variables were used: teacher commitment to shared goals and norms, collaboration, and focus on student learning (expectations and encouragement). As Bryk and Driscoll (1988) note, it is difficult to obtain good information about the phenomenological elements of community. Thus, since a shared sense of norms, values, and beliefs is difficult to garner from teacher questionnaires, we have chosen to utilize teacher commitment to shared goals to indicate the likely absence or presence of this element of community. Further, much of the literature supports the hypothesis that organizational commitment is related to student engagement and achievement (Ashton and Webb, 1986; Bidwell and Quiroz, 1991; Rosenholtz, 1989; Little, 1990; Seashore Louis, 1991; and Reyes, 1992).

Teacher organizational commitment is defined as a composite index of items measuring shared goals, intention to stay, and extra effort (see Appendix A for specific items). This definition of organizational commitment has been supported in the literature and in empirical

studies on teachers (Mowday, Porter, and Steers, 1982; Reyes, 1990, 1992). The reliability coefficient for this scale is r=.79. This construct of commitment has been also tested for validity purposes indicating that the organizational commitment has both construct and content validity (Reyes, 1992).

The second element of community which we utilize is teacher collaboration. When teachers collaborate they are more likely to be effective in teaching their students than those who work individually (Newmann, 1994). While it has been established that given a problem-solving task some groups produce better than others (Johnson & Johnson, 1975), we argue that when collaborative norms undergird the workings of groups of teachers, they bring new ideas, use different perspectives to problem-solve, and develop a stock of information that is more fruitful than any teacher working alone (Rosenholtz, 1989). In this study, we use teacher collaboration as a communal variable (see appendix A for specifics).

Finally, we utilize also teachers' expectations and encouragement as indicators of the communal element of focus on student learning. Not only are teachers' expectations and encouragement indicators of a sense of community, they are both highly related to student academic success (Brophy & Good, 1981). .

Analytic Method

In order to test our hypothesis about organizational differences between middle and high schools, we collapsed the individual-level data to school-level, reducing the number of cases to 50 pairs of schools. We used a means analysis procedure to test for differences among the communal variables of commitment to shared goals, collaboration, and teacher expectations and encouragement.

To test our second hypothesis, we used ordinary least squares regression as our primary tool for assessing students' growth in math achievement. Although over 3,000 students were included in the initial LSAY cohort, there are three reasons for the reduced sample: attrition of students over time; missing data for students at different points in time; and teacher non-

response. Because of our interest in the relation between teacher perceptions and behavior on the one hand, and student outcomes on the other, we were most concerned about the loss of cases due to teacher non-response. To cope with teacher non-response, we created an indicator which helps correct for this problem in the regression analyses. The indicator is a measure of students' propensities to have a teacher who failed to respond to the questionnaire. It is constructed with a regression equation that predicts the likelihood of having a non-responding teacher. By including this variable in the regression analyses, the effects of the other independent variables in the model are purged of a spurious correlation due to students' differential likelihood of having non-responding teachers (Berk, 1983).

FINDINGS

Tables 1 - 4 present the means, standard deviations, and regression results. Table 2 contains the mean scores of indicators of communal organization. Our hypothesis that both types of schools differed on the communal variables is not supported. No significant difference exist between the middle schools and high schools on the communal variables. Further analyses of the data indicate that within school variation was larger than between schools. This shows that middle schools differ more among the middle school sampling units than between middle and high schools. Despite this outcome, the trend in the mean scores show that middle schools have higher means than high schools on the variables measured in this study.

In the regression analysis the first column shows the impact of student background conditions without considering selected variables of community. The second column adds the three elements of community: teacher collaboration, commitment to shared goals, and student focus. Each column represents a regression equation, so each coefficient in a column describes the impact of that variable, controlling for all the other variables included in that column. The first column in Table 3 shows that gender, socioeconomic status, and parent expectations exert a significant effect on seventh-to-eight-grade achievement growth in mathematics. Out of the student background model, parent expectation is the most important variable in predicting

mathematics achievement. For instance, there is a significant relationship between parental encouragement to work on math and student achievement gain in mathematics. Similarly, the data show that if the parent thinks that math is important, then the student is more likely to gain in mathematics achievement.

Effects of communal variables

The second column of Table 2 shows the expanded model that includes the communal variables of collaboration, commitment to shared goals, and focus on students. The communal variable of collaboration yielded positive effects on student achievement gain in math. Similarly, the variable of commitment to shared goals produced positive effects on math achievement gain. Although the coefficients are quite small, extra effort on the part of teachers is associated with student math achievement gain. Similarly, teachers' absence from the classroom is negatively related with student math achievement gain. Lastly, the variable academic push is also related to student academic achievement gain in math. It appears that the more teachers push students towards studying math, the more likely the students achieve in math.

In Table 3, we present the information for high school students. The first column presents a student background model; while the second column shows an elaboration model that includes the student background variables and the selected communal variables of teacher commitment, collaboration, and teacher focus on students. The student variable model shows again that if the parent thinks math is important, then the student is more likely to gain in math achievement. Similarly, the augmented model shows that teacher collaboration has positive effects on math achievement. Indeed, higher levels of teacher collaboration are associated with student achievement in math.

Teacher commitment also relates positively to student achievement gain in math. As in the seventh grade analysis, extra effort on the part of teachers yields positive effects on student math achievement. On the other hand, teacher absence from the classroom produces negative effects on math achievement. Finally, teacher expectations for both ninth grade and tenth grade yield positive effects on student math achievement.

Discussion

Our hypothesis that high schools are organized more or less as bureaucratic organizations and that middle schools are organized more or less as communities is not supported by our data. It appears that no coherent pattern of support is found in these data. One would expect that in high schools, teacher commitment is devoted to teachers' subject matter and that collaboration and teacher focus on students are less evident in high schools. Both middle schools and senior high schools, however, exhibit similar levels of teacher commitment, teacher focus on students, and collaboration.

The fact that there is no difference between middle and high schools merits further discussion. Cuban (1990) noted that educational reforms rarely alter the regularities of schooling. Why should, then, we expect that middle schools alter in any significant way earlier patterns of organization, such as the junior high school model? This question has particular relevance since the middle school movement has just began to be implemented. Some scholars argue that the original junior high school movement started with much the same ideology as the middle school movement–the idea to replace junior high schools for middle because no change was effected (Cuban, 1990; Fullan, 1991). Thus, there is no reason to believe middle schools, as a group, have actually changed their practices.

In fact, Meyer and Rowan (1991) argue that the formal structures of schools dramatically reflect the myths of their institutional environments instead of the demands of their work activities. This indicates that because we already have a set conception of what schools look like, it is unlikely that any reforms such as the middle school movement, will radically transform traditional schools practices (Sizer, 1984). DiMaggio and Powell (1991) concur the aforementioned point stating that schools "may try to change constantly; but after a certain point in the [institutional definition] of the organizational field, the aggregate effect of individual change is to lessen the extent of diversity within the field." (pg. 65). Thus, it is not surprising that middle schools are no different than high schools.

Ourt second hypothesis, that some variables that characterize schools organized as communities such as teacher commitment, focus on student success, and collaboration may be linked to student achievement is supported. It is clear that in middle school teacher commitment to shared goals, collaboration, and teacher academic push vary positively with math achievement gains. Similarly, the variables that characterize schools as communities were also present in high schools. Teacher collaboration, commitment, and focus on students were positively related to math achievement gains for students in high schools. Thus, our hypothesis that selected elements of schools organized as communities are associated with student math achievement gain is supported.

One may argue that the added explained variability between the student model and the school model is somewhat insignificant. One possible reason for the relatively insignificant effect of the selected elements of community on the mathematics achievement of students is that the effects of the development of a sense of community are seriously dampened by the organizational structures of schools (DiMaggio & Powell, 1991). That is, the characteristics of communal schools have little or no effect unless they are developed concomitant with school restructuring. Thus, even when some elements of community are present at the secondary level of schooling, large school enrollments, overcrowded classrooms, numerous classes per day, and other organizational constraints tend to overshadow the effects of community and maintain a relatively impersonal and alienating environment for students.

For example, even if teachers collaborate, develop consensus on instructional goals, and possess a caring attitude towards students, large school enrollments, overcrowded classrooms, and numerous short classes can preclude the development of strong, affective relationships between teachers and students and the implementation of pedagogical techniques that enhance student engagement. Clearly, further investigation into the effects of the elements of community on student achievement both in conjunction with and apart from organizational restructuring need to be undertaken. Important policy implications for schools would be forthcoming if the

conclusion can be made that a sense of community has little significant affect on achievement without the restructuring of the organization of the school.

CONCLUSIONS

The main contribution of this paper, we hope, is to provide more empirical information on the notion of professional community, particularly as it relates to schools as organizations. Clearly, further work is needed to reaffirm the effects of the notion of professional communities on student achievement. The exploratory empirical analysis carried out in this paper offers evidence, albeit limited, that some elements of a professional community particularly teacher collaboration, teacher commitment to shared goals, and teacher focus on students, vary with student achievement in mathematics.

Despite the limited support for the elements of community, there is reason to continue to explore the effects of the notion of professional community on student achievement. The theory and some of the evidence herein give reasons to continue this work. Moreover, there are other outcomes besides student achievement for which schools organized as professional communities may be useful (e.g., the development of caring, nurturing students and/or improvement of work life conditions for teachers). The fact remains that teachers' work life is mostly isolated and that little professional dialogue takes place in schools which are mostly organized as bureaucratic organizations.

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Appendix A. Description of Variables Used in the Analysis

Variable Name	Description (LSAY codebook variable names in parentheses)
	Student Achievement Outcomes
1987	IRT score for composite test consisting of NAEP items (AMTHIRT).
1988	IRT score for composite test consisting of NAEP items (CMTHIRT).
1989	IRT score for composite test consisting of NAEP items (EMTHIRT).
1990	IRT score for composite test consisting of NAEP items (GMTHIRT).
	Student Social Background
Female	Student gender (1 = female, 0 = male) (AA29).
SES	Family composite socioeconomic status; constructed from parental education (maximum of MOTHED and FATHED), occupation (maximum of Duncan SEI variables BH281S, BH287S, DH267AS, and DH267BS), and household possession index (sum of BA15A, BA15B, BA15C, BA15F, and BA15I: daily newspaper, a specific place to do homework, a typewriter, a room of your own, and a weekly news magazine) (SES3). The three components were separately standardized, and the standard scores averaged to form an equally-weighted composite for each student.
Parent Push	Parent push for success in math classes; Student report from year 1. Sum of student's agreements with AA19E ("My parents have always encouraged me to work hard on math"), AA19O ("My parents expect me to do well in math"), and AA19Q ("My parents think math is important").
	Focus on Students: Student Reports
Teacher Expectations(3)	Math teacher Enjoys teaching (FA8A). Expects the best from me (FA8B). Encourages extra work (FA8C). Expects hard work (FA8D). Expects completed homework (FA8E). Thinks I should do well (FA8P).
Teacher Expectations(4)	Math teacher Enjoys teaching (HB7A). Expects the best from me (HB7B). Encourages extra work (HB7C). Expects hard work (HB7D). Expects completed homework (HB7E). Thinks I should do well (HB7P).
Academic Push	Math teacher pushes student to work hard: student reports. Constructed by summing individual student responses to the following spring 1989 true-false-don't know (coded 1, 0, -1, respectively) questions about "My math teacher this semester..." (alpha = .73):

0 ... expects me to do my best all the time (DA3B).
0 ... encourages me to do extra work when I don't understand something (DA3C).
0 ... expects me to work hard on math (DA3D).
0 ... expects me to complete my homework every night (DA3E)
0 ... thinks it is very important that I do well in math (DA3P).

Career Push

Teacher pushes student toward mathematical career: student reports. Constructed by summing individual student responses to the following spring 1989 true-false-don't know (coded 1, 0, -1, respectively) questions about "My math teacher this semester..." (alpha = .75):

0 ... has talked to me about the kind of job I might want to do (DA3G).
0 ... expects me to go to college (DA3H).
0 ... has encouraged me to take all the math I can get in school (DA3M).
0 ... has encouraged me to think about a career in math (DA3N).

Collaboration

(alpha = .84)
Teachers in this school are continually learning and seeking new ideas (BE21).
There is a great deal of cooperative effort among staff (BE24).
Staff members maintain high standards of performance (BE25).
The teachers in this school push the students pretty hard in their academic subjects (BE31).

Commitment

(alpha = .79) Scale 1-6 (1 = strongly disagree, 6 = strongly agree)
Shared goals:
Goals and priorities for schools are clear (BE23).
I usually look forward to each working day at this school (BE26).
I sometimes feel it is a waste of time to try to do my best as a teacher (BE28, reverse-coded).
In this school, there is really very little a teacher can do to ensure that all of his/her students achieve at a high level (BE32, reverse-coded).

Teacher gives me extra help (BA13K).
Days Absent. Days absent this school year (DA17).

Table 1 Means and Standard Deviations

Variables	8th Grade Mean	8th Grade SD	10th Grade Mean	10th Grade SD
Dependent Variables				
Fall 8th gr. Math	52.86	11.13		
Fall 10th gr. Math			60.45	13.75
Student Background				
Fall 7th gr. Math	50.91	10.05		
Fall 9th gr. Math			57.54	12.14
SEX (1 = female)	.49	.50	.50	.50
SES	-.02	.74	.02	.74
Parent: Encourages work on math	.70	.45	.70	.46
Parent: Expects me to do well in math	.69	.46	.69	.46
Parent: Thinks math is important	.69	.43	.69	.46
Teacher Collaboration	16.95	1.76	16.94	.79
Teacher Commitment				
Shared goals	14.14	.45	14.12	.46
Extra effort	1.22	.40	1.27	.79
Days absent	2.81	1.31		
Focus on Students				
Academic push	5.65	.87	5.60	.81
Career push	6.81	1.23	6.80	1.24
Teacher Expectations3			6.99	1.15
Teacher Expectations4			7.15	1.26
	(N = 2050)		(N = 1600)	

*P > .05; **P > .01

Table 2 Mean Analysis of School-level Communal Variables

	Middle Schools	High Schools
T Expectations and Encouragement	5.758	5.012
T Commitment	14.208	14.031
T Collaboration	16.639	16.126
	N = 50	N = 51

*No significant differences

Table 3 Metric Coefficients for regression on achievement growth in mathematics (Middle/Junior High Schools)

Independent Variables	Models (1)	(2)
Fall 7th Grade Math	.68**	.68**
SEX (1 = female)	1.02**	1.01**
SES	.04*	.04*
Parent encourages work on math	.03*	.03*
Parent expects me to do well in math	.01	.01
Parent thinks math is important	.10**	.10**
Teacher Collaboration		.13*
Teacher Commitment		
Shared Goals		.01
Extra Effort		.05**
Days Absent		-.08**
Focus on Students		
Academic Push		.06*
Career Push		.02
Adjusted R^2	.50	.52

*P > .05; **P > .01

Table 4 Metric Coefficients for regression on achievement growth in mathematics (High Schools)

Independent Variables	Models (1)	(2)
Fall 9th Grade Math	.58**	.58**
SEX (1 = female)	1.02**	1.02**
SES	.05*	.06*
Parent encourages work on math	.007	.008
Parent expects me to do well in math	.014	.014
Parent thinks math is important	.13**	.12**
Teacher Collaboration		.11**
Teacher Commitment		
Shared Goals		.03
Extra Effort		.23**
Days Absent		-.16**
Focus on Students		
Academic Push		.04*
Career Push		.01
Expectations 9th grade		.04*
Expectations 10th grade		.05*
Adjusted R^2	.60	.62

*P > .05; **P > .01